JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

THIRD YEAR SECOND SEMESTER UNIVERSITY EXAMINATION FOR BSC. AGRICULTURAL EXTENSION EDUCATION/ BSC. HORTICULTURE AND / BSC SOIL SCIENCE

2019/2020 ACADEMIC YEAR

REGULAR

COURSE CODE: ALS 3326

COURSE TITLE: PRINCIPLES OF IRRIGATION AND DRAINAGE

EXAM VENUE: **STREAM: BSc. Agric. Ext. Educ. & Soil Science, Hort.**

DATE: **EXAM SESSION:**

TIME: 2 HOURS

INSTRUCTIONS:

1. **Answer ALL questions in section A and ANY other 2 Questions in section B.**
2. **Candidates are advised not to write on question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A [30 MARKS]

Answer ALL questions from this Section.

1. Briefly describe the **Five** factors govern the importance of irrigation **(5 Marks)**

2. Illustrate, with a labeled diagram, the general layout of a distribution system for Canal Irrigation water between a river water source to field application **(5 Marks)**

3. Describe aby **Five** variables (factors) that aid surface irrigation **(5 Marks)**

4. Explain **Five** Components of a typical irrigation system ought to be maintained **(5 Marks)**

5. Describe Five factors that should be observed while considering groundwater as a source of irrigation water. **(5 Marks)**

6. Outline any **Five** purpose of carrying out irrigation water measurement **(5 Marks)**

SECTION B [40 MARKS]

Answer ANY TWO questions from this Section.

7. In a sprinkler Irrigation System, water is pumped through a pipe system and then sprayed onto the crops through rotating sprinkler heads. Demonstrate the concept of Sprinkler Irrigatiojn System under the following themes: **(20 Marks)**

   i. Advantages of sprinkler irrigation

   ii. Physical parameters considered while selecting appropriate sprinkler systems

   iii. Design aspects of sprinkler irrigation system

   iv. If in a sprinkler irrigation system, lateral spacing along the mainline is 20m and sprinkler spacing along laterals is 15 m and the application rate for fulfilling peak demand of the proposed crop is 8 mm/d, what is the discharge rate per sprinkler. Assume application rate is given by:

$$I(\text{mm/hr}) = \frac{3600 \times q_s(\text{l/s})}{S_m(m) \times S_l(m)}$$

8. Describe in details the following components of an Irrigation Water Supply System: (i) Head water (Intake) facility, (ii) Pumping station (or gravity station), (iii) Conveyance system, (iv) Irrigation network system, and (v) Field application system **(20 Marks)**

9. Illustrate the circumstance that may occasion application of both gravitational and pressurized forms of irrigation, and further, describe the kinds of maintenance activities that are recommended to be carried out on irrigation equipment. **(20 Marks)**

10. Drainage is the removal of excess water artificially from a farm land and is a complementary practice to irrigation. Discuss the importance or drainage and, using sketch diagrams, elaborate the concepts of surface and underground drainage method **(20 Marks)**